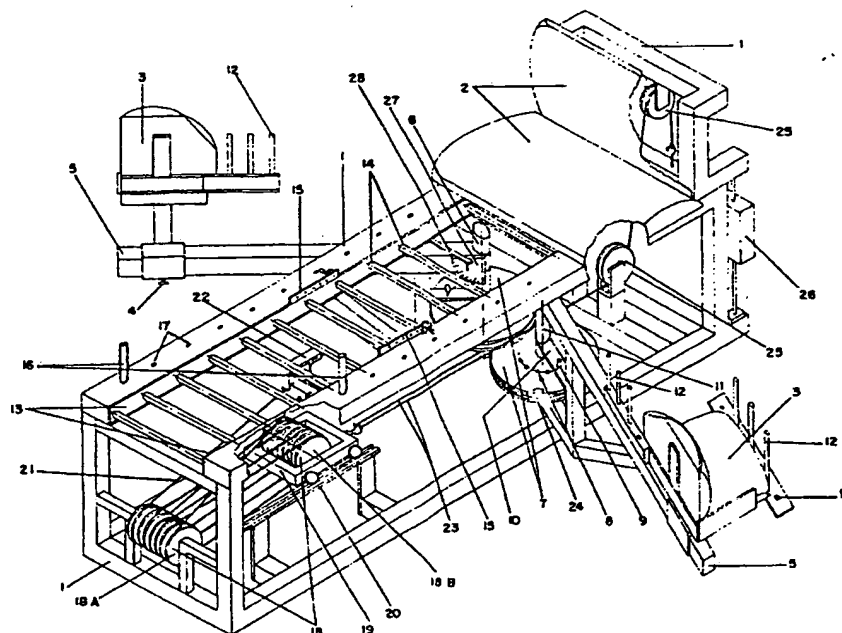


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(54) Title: DEVICE FOR MUSCULAR ELONGATION, FLEXION AND PHISIOTHERAPY

(57) Abstract

The present device, which includes four accessories, incorporates in one machine that which is required for the elongation of muscles in all parts of the body, namely: the static, the dynamic, and the 3s or PNF Methods. The device consists of a main frame (1), a seat with a back (2) mounted on the frame's upper surface, two lateral foot supports (3), and a rolling car (13), which when pulled, operates a load-reducing mechanism (18) which includes two pulleys (7) connected to two supports (5), which open laterally or sidewise, and carry with them two supports (3). Each foot support (3) is equipped with hand grips (12). The accessories include two additional foot supports (29, 33) attachable to the car (13), two modules (35) fitted laterally into the frame (1) and used to support the legs when bent or flexed, and a support accessory connected to the frame (1) through the supporting column (43).

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DEVICE FOR MUSCULAR ELONGATION, FLEXION AND PHYSIOTHERAPY

The present invention relates to a device which enables the achievement of extending various muscles of the human
05 - body, through all of the means known for muscular elongation, as follows: STATIC (without movement), DYNAMIC or BALLISTIC (with motion), and the 3s or PNF METHOD.

At the present time, the
10 - devices existing for muscular elongation do not satisfy the requirements of the user, inasmuch as they only operate on isolated groups of muscles, using only one type of elongation, namely the STATIC, thus making further progress impossible. In addition to the fact that
15 - they require excessive and onerous effort, inasmuch as they generally are activated by a cranking mechanism, they limit the movements of the user, in that the latter, not having any point of support or place of attachment, to maintain his balance or to extend his other muscles,
20 - has no option left open involving other types of exercise. This being so, outside help is almost always required to assist the user in achieving the range of motion.

The present invention has
25 - been developed with the aim in mind of solving all of the problems mentioned above, the main objective being to make it possible for the user to fully use and apply to

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all parts of his body exercises for muscular elongation and muscular flexion, through gentle, safe, and smooth movements. When appropriately positioned, the user will obtain perfect harmony of the leg and thigh muscles, the
05 - spinal column being unhindered and protected, without risk of muscular twisting or strains. Moreover the device is able to block the internal leg muscles, once having been extended to the limits of their flexibility, thus inducing relaxation of other muscles used in executing
10 - movements; thus they are not unduly stretched, and what is most important, avoid stress on the spinal column. In addition to providing for the harmonious functioning and easement of the body, the device is easily operated providing support for the hands in all positions of
15 - operation. Thus the device allows for harmonious and progressive exercises, facilitating conditions for rhythmic and controlled breathing, which are so necessary in elongation exercises.

The said device consists
20 - of a structure upon which a movable car operates. When this is pulled it activates two leg supports, which open to form an angle of 180 degrees and the effort required being sufficiently diminished by a load reducing mechanism. The device makes possible gentle and rhythmic
25 - movements of the body. These result in the simultaneous elongation of the inside thigh muscles, as well as those of the back, shoulders, arms and hands, by means of all the types of muscular elongation heretofore specified.

When the car is pulled the inside muscles of the legs (thighs, knees, calves and feet) and when the legs are drawn together all of the muscles of the back trunk, shoulders, arms and hands are extended, the latter gripping the parallel bars of the seat car. The effort required to move the car is greatly reduced by the load reducing mechanism, both in the case when the car is being pulled as well as when the leg supports are being pulled together, thus protecting the spinal column. The simultaneous elongation of the leg and back muscles, as well as those of the back, arms, and hands may also be effected using the 3S or PNF method, which consists of a three-mode operation: 1) simple elongation, 2) contraction without muscle motion, and 3) relaxation, yielding greater results than those hitherto described. This method is most effective with respect to the development of flexibility, which is defined as the range of voluntary movement of a joint, or combination of joints in any determined direction. It helps muscular elasticity and permits a more ample range of motion for the different parts of the body. Muscular elongation, on the contrary, is characterized by half the range of muscle motion. The 3S or PNF method is widely used in physiotherapy exercises in cases of distension and contraction of the muscles.

The invention may better be described by the following detailed explanation

together with the attached drawings, as follows:

FIGURE 1, shows an overall view of the device, in perspective.

05 - FIGURE 2, also in perspective shows an overall view of an auxiliary accessory used in extensions of the leg calf, the Achilles heel, and of the back of the thighs.

10 - FIGURE 3, in perspective, shows an overall view of an accessory used in extending the inside muscles of the leg, trunk , arms and hands.

FIGURE 4, in perspective, shows an overall view of the accessory used to lengthen the top leg muscles and those of the top of the foot.

15 - FIGURE 5, in perspective, shows an overall view of the accessory used to lengthen the front trunk muscles (the pectoral muscles), the shoulders, arms, and hands.

20 - With reference to FIGURE 1, the upper surface of the device is equipped with a seat (2), with a back and two lateral foot supports (3), all being on the same level, and is equipped with longitudinally adjustable stops (4) allowing adjustments of supports (5). The latter are connected to two rotating axles (6), which operate parallel to each other, and
25 - vertically fastened to frame (1), where they are connected to two pulleys (7), containing perforations (8) in such a way that they allow of positioning the supports (5) which are adjustable from the inside outwards, or in

other words laterally. These adjustments vary from zero to ninety degrees for each pulley (7), which makes it possible to open the supports (3) to form an angle of one hundred and eighty degrees. In order to make an
05 - adjustment one pin (9) is inserted into plate (10), in such a way that the perforation coincides with the perforations (8) of the pulleys (7). The supports (5) are held in place and pinned to the pulleys (7) in this way. This plate (10) connects each support (5) to another
10 - rotating tube (11) which turns freely around each axle (6). Inasmuch as the two supports (5) rotate independently of each other and also of the pulleys (7) it will be seen that each support (5) can be set to the desired angle, allowing each support (3) to be set and
15 - fixed to any position desired. For each support (3) there are parallel vertical bars (12) which serve as hand grips. These bars (12) may be fixed or movable, and are located near the supports (3). Moreover the upper part of the structure (1) is equipped with a sliding car (13)
20 - which is free to move in a longitudinal direction between the two extremities of the long axis of the device, and runs under the seat (2) towards the rear end of the structure (1). This car (13) serves as a lever and is propelled by means of horizontal parallel bars (14); it
25 - may be blocked at any position of its course by means of blocking device (15). The upper part of the frame (1) is equipped with auxiliary and movable hand grips (16), which can be set to the desired position by inserting

them into the orifices or perforations (17) running the length of the upper surface of the frame (1). On the inside of the frame (1) there is a load-reducing mechanism (18) for reducing the load, consisting of two groups of "n" pulleys which, independently, turn on two axles. The first group of pulleys (18-A) operates with its axle fixed to the frame (1). The second group (18-B) has its axle fixed to the movable car (19) which runs on rails (20). A single cable (21) connects all of the pulleys of the mechanism (18), interconnecting both groups (18-A and 18-B); one end of the cable is attached to support (22), connected to the bars (14) of the car (13). From there the cable is threaded through the mechanism (18), returning to support (22), where the other end of the cable is attached. Two other cables (23), the ends of which are fixed to car (19), begin at the car and make a complete turn around each pulley (no. 7) from whence each cable is duly fixed (to avoid slippage) by a blocking mechanism (24). These cables then pass through a group of pulleys (25) serving as guides. The other ends of the cables are attached to a counterweight (26) or spring, the purpose of which is to close brackets (5) and to keep the cables (23) taut. Moreover, the device is equipped with two instruments (27) for measuring angles permitting variable settings. Each measuring instrument is attached to a bracket (5), and as the latter opens, the instrument accompanies it. The initial starting point is set at zero degrees and the

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final position at 90 degrees. The indication of the angle uses a pointer (28) attached to the frame (1).

In order to demonstrate the utility of the invention some exercises are listed below.

The user seats himself/herself comfortably on seat (1), with the legs resting on the lateral supports (3), pushing the rolling car (13), with the spinal column maintained in an erect position, and the supports will open, laterally stretching the leg muscles. Once the degree of opening desired is achieved, the blocking device (15) is activated, stopping the car (13). In this manner the hands are free and the muscles of the trunk may be stretched by bending frontwards over the car, and gripping the bars (14) or the auxiliary supports (16). If lateral elongation or stretching is desired, the same procedure is followed, by bending towards and over each leg, in the direction of the feet, using the parallel vertical bars (12) attached to the supports (3) as hand grips. When a sufficient amount of muscular elongation is obtained, the car (13) is unblocked and it is again pushed forward, in this way increasing the angle formed laterally by the spreading of the legs. Once the car has been fixed in place, all of the motions for elongating the muscles of the trunk are repeated. This procedure is followed sequentially. Inasmuch as the hand grips may be set to correspond to all the positions of the device, the

range and variety of possible exercises is great. This is so because muscular elongation can take place with greater assuredness and balance, allowing the body to be bent in any direction, which involves the stretching of the muscles relating to the motions. To cite an example: when the trunk is stretched by bending frontwards or in the direction of either of the legs, laterally, all of the rear muscles of the legs and trunk will be naturally elongated.

Figure 2 includes a horizontal support (29) coupled to a vertical support (30) at the extremity of which is a protuberance (31). There is a joint (32) at the lower end of the horizontal support (29) which is attached to the parallel bars (14) of the car (13). In order to exercise, the foot of the user rests on protuberance (31) and his heel rests on the lower part of the vertical support (30) and at the same time on the horizontal support (29). As the trunk is projected or bent forward, using the hand grips (16) for the hands, the user being duly seated on seat (2), the back part of the leg muscles will be extended, chiefly in the area of the calves and the Achilles heel inasmuch as the foot will be half bent or flexed due to the fact it will be at a lower angle than the heel, in this wise compelling a greater amount of stretching.

Figure 3 includes a support (33) with a joint or coupling (34) which is attached to the parallel bars (14) of the car (13).

This accessory is used when performing what is known as the "butterfly" stretch. The soles of the feet rest on support (33), the user is duly seated on the seat (2) and in this way the front and

05 - inside muscles of the thighs and knees may be extended. When the body is thrown forward using the hand grips (16), the muscles mentioned above will be further stretched as well as affecting the muscles of the back, shoulders, arms and hands.

10 - Figure 4 includes two modules (35) which are each attached to the sides of the frame (1) adjacent to seat (2). These modules (35) may be adjusted longitudinally with reference to the frame (1). They serve to support the legs when stretched, the

15 - positioning of which makes it possible to lengthen the top muscles of the legs and the back or top of the feet. Examples of some exercises: The user, properly positioned on seat (2), flexes one or both of his legs, on modules (35). The other leg, may remain extended, resting the

20 - foot on the accessory (fig. 2) or bent over the accessory (fig. 3). This allows for muscle stretching by throwing the body forward, using the hands grips (16), or by making sidewise turning movements. Such motions are assisted by hand grips (12), when positioned near the

25 - foot supports (3). In order for this to take place, supports (5) must be disconnected from the pulleys (7). Since supports (5) are free to move, the hand grips (12) come into play; the trunk is rotated till it touches the

leg bent over one of the modules (35); in this way all of the lateral trunk muscles, the shoulder, arm, hand, thigh and foot muscles will be stretched.

Figure 5 includes two supports (36) which move along a disc (37). When they are in the closed position, they lie at the center of the disc, but they may be opened. These supports (36) are adjustable for angles from 0 a 90 degrees each. The disc (37) is perforated with holes (38) for fixing supports (36) which also have perforations (39) for attaching hand grips (40), which are adjustable longitudinally along supports (36). The latter are coupled to two rotating axles (41), also attached to disc (37). The adjustment and attachment of the supports (36) to the disc (37) is made possible by attachment pins (42) which fit into the perforations (38). Disc (37) is coupled to column (43), which is also attached to frame (1), back of the seat back (2); they may be vertically adjusted by means of joint (44).

This accessory is used for the STATIC elongation of the front muscles of the thorax (the chest muscles), as well as for the muscles of the shoulders, arms, and hands.

We give examples of some exercises: The user is positioned on seat (2), using the two hand grips (40), having duly adjusted the supports (36) for the angle desired. In this way, all of the muscles referred to above are stretched, with the sides

duly protected by the seat back (2); this allows for relaxation followed by progressive and further stretching. When a satisfactory amount of elongation has been achieved, the whole process is repeated by again adjusting the supports (36) to the angle desired, so that they meet together at the center of the disc (37).

Another variation of this exercise consists in the lateral or sidewise stretching of the legs, which have been duly block-positioned; the entire sequence of operations referred to above is then repeated. Satisfactory stretching, muscle flexing and physiotherapeutic applications are achieved by the use of a great number of exercises with the aid of the accessories.

C L A I M S

1) "MECHANICAL DEVICE FOR
MUSCULAR ELONGATION, MUSCULAR FLEXION AND PHYSIOTHERAPY"
consisting of a frame (1) the upper surface of which
includes pointers (27) for angles, hand grips (16), a
05 - seat with a back (2) and foot supports (3) which also
have hand grips (12) and are adjustable through brackets
(5) which open sidewise or laterally by means of rotating
axles (6), coupled to pulleys (7), which are adjustable
by means of devices (8) the latter being operated by
10 - cables (23) connected to a load-reducing device (18),
consisting of wheels (18-A and 18-B), interconnected
through and by means of cable (21). The latter is pulled
by a rolling car (13), by means of paralell bars (14).

2) "MECHANICAL DEVICE FOR
15 - MUSCULAR ELONGATION, MUSCULAR FLEXION AND PHYSIOTHERAPY",
in accordance with claim 1, is characterized by the fact
that car (13) is equipped with a horizontal support (29)
with joints (32), coupled to a vertical support (30), at
the end of which there is protuberance (31).

20 - 3) "MECHANICAL DEVICE FOR
MUSCULAR ELONGATION, MUSCULAR FLEXION AND PHYSIOTHERAPY",
in accordance with claim 1, is qualified by the fact that
car (13) is, in addition, equipped with a support (33),
with a joint or coupling (34).

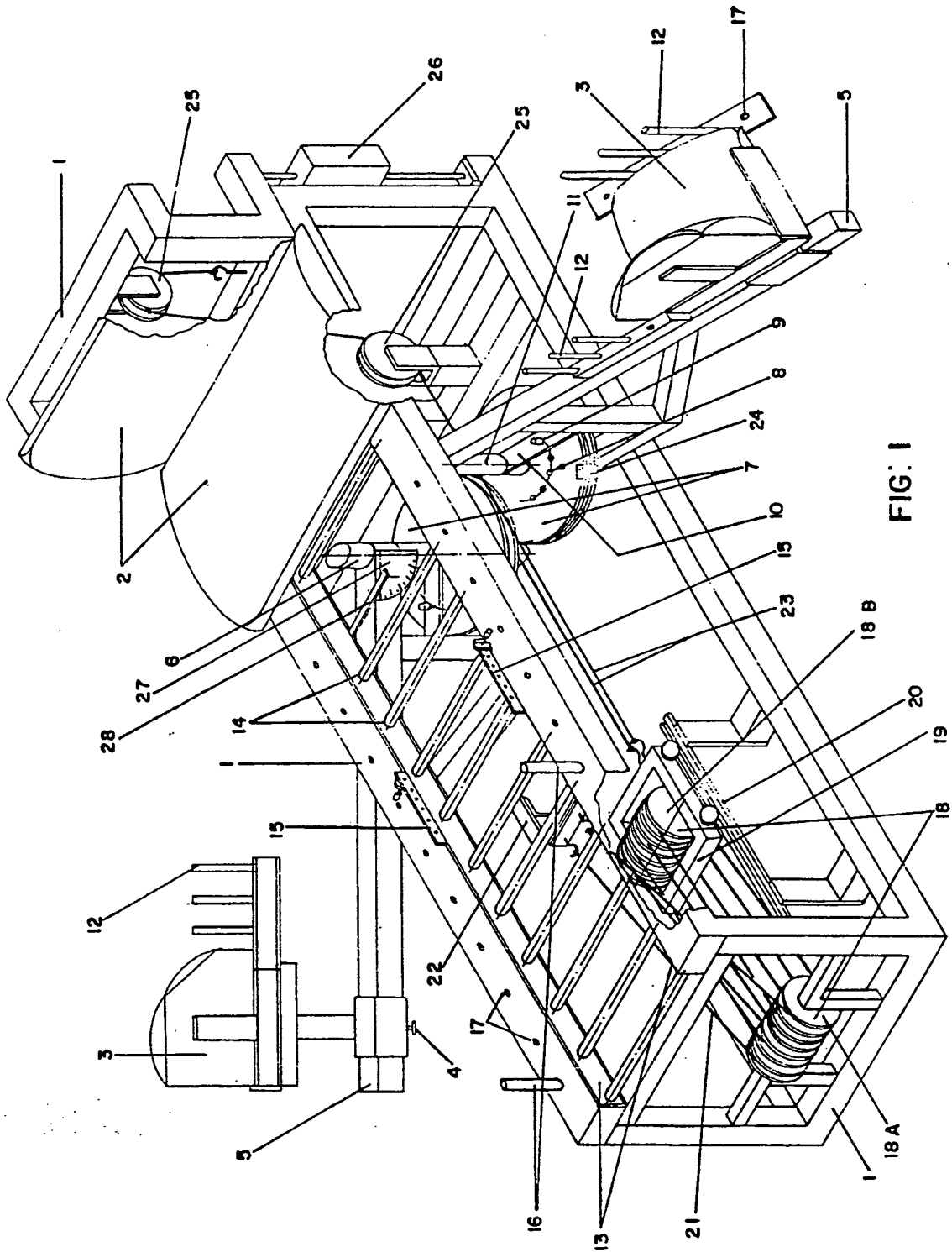
25 - 4) "MECHANICAL DEVICE FOR
MUSCULAR ELONGATION, MUSCULAR FLEXION AND PHYSIOTHERAPY",

- 13 -

in accordance with claim 1, is qualified by the fact that frame (1) is equipped with modules (35) or lateral supports.

- 5)" MECHANICAL DEVICE FOR
- 05 - MUSCULAR ELONGATION, MUSCULAR FLEXION AND PHYSIOTHERAPY",
in accordance with claim 1, is characterized by the fact
that frame (1) is, moreover, equiped with supports (36)
connected to rotating axles (41), and to the fact that
these supports (36) connected to rotating axles (41), and
10 - to the fact that these supports (36) move around
within a disc (37) and regularity device (38) and
equipped with adjusting devices (39). The supports (36)
are also adjustable by means of devices (39) and are
equipped with hand grips (40) disc (37) being connected
15 - with column (43) which also is adjustable by means of
devices (44).

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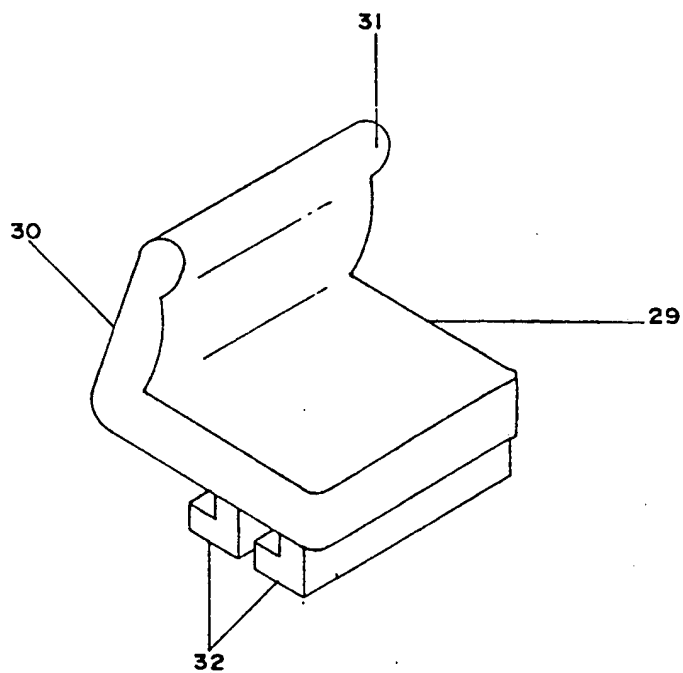


FIG. 2

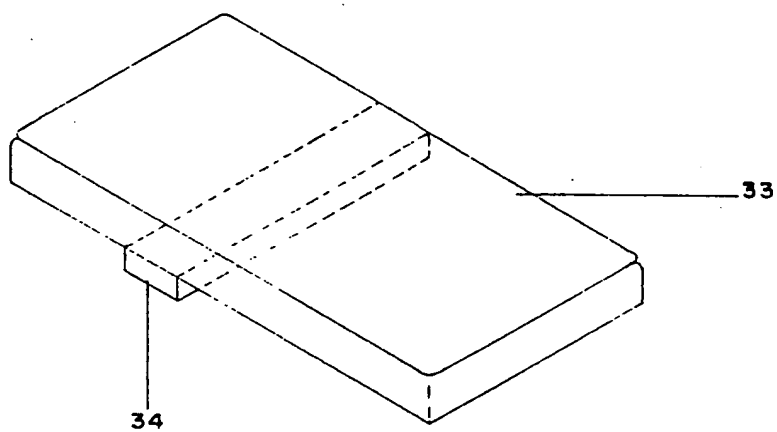


FIG. 3

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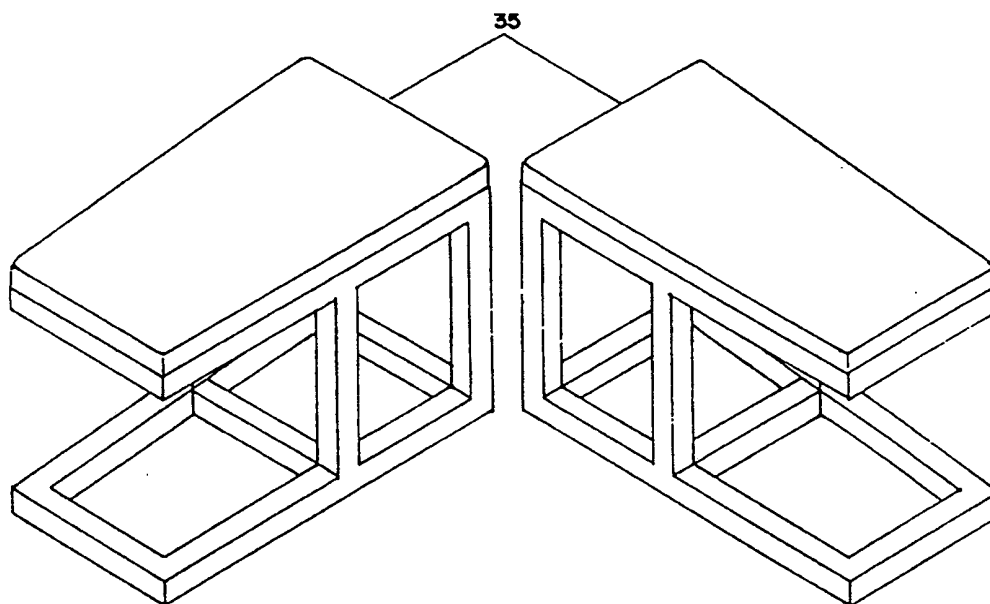


FIG. 4

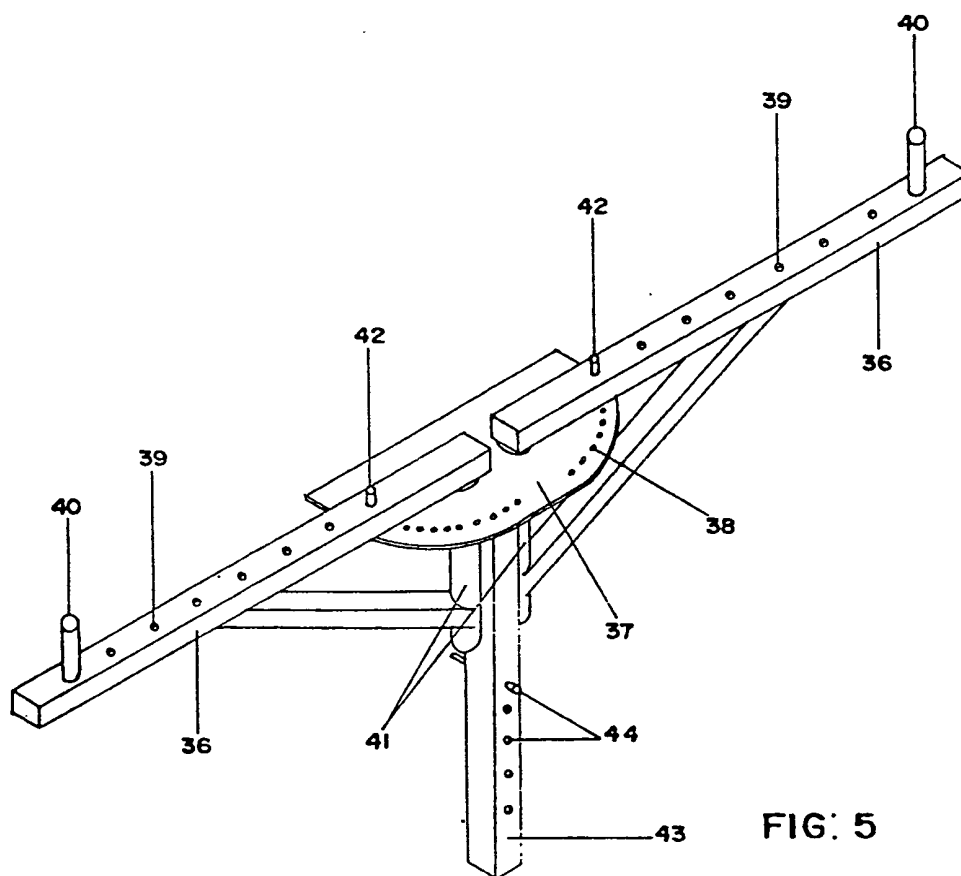


FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/BR93/00043

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :A63B 21/00; A61H 1/02

US CL :482/131, 907; 601/24, 35

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 482/131,142, 907; 601/24,26,33,35; 606/241,242,243,244,245

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
noneElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
none**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US, A, 4,844,453 (HESTILOW) 04 JULY 1989	
A	US, A, 4,445,684 (RUFF) 01 MAY 1984	
A, E	US, A, 5,277,681 (HOLT) 11 JANUARY 1994	
A	US, A, 4,089,330 (NICOLOSI ET AL.) 16 MAY 1978	



Further documents are listed in the continuation of Box C.



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Date of the actual completion of the international search

05 MAY 1994

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